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FIELD TASK MODIFICATION REQUEST FORM TO SAMPLING AND ANALYSIS PLAN
FACILITY INVESTIGATION SOLID WASTE MANAGEMENT UNIT 18 (SWMU 18) LOAD AND
FILL AREA NSA CRANE IN
2/15/2013
TETRA TECH



TETRA TECH

FIELD TASK MODIFICATION REQUEST FORM

Project/Installation Name <u>SWMU 18 – Load and Fill Area, NSA Crane, IN</u>	CTO & Project Number <u>CTO F201; 112G01851</u>	Task Modification Number <u>1001</u>
Modification to: <u>Sampling and Analysis Plan, RCRA Facility Investigation, SWMU 18-Load and Fill Area</u>	Site Location <u>Subarea I – Building 200 Area</u>	Date of Request <u>February 15, 2013</u>

Background. Tetra Tech performed RCRA Facility Investigation (RFI) sampling at Subarea I – Building 200 Area – from October 2011 through January 2012 that included the collection of surface and subsurface soil samples, composite soil samples, sediment samples from settling basins, and groundwater samples (Figure I-1). The samples (except the composite soil samples) were analyzed for explosives and metals. One subsurface soil sample was also analyzed for fuel oil parameters; the sediment samples were also analyzed for volatile organic compounds (VOCs) and fuel oil parameters; and, the groundwater samples were also analyzed for ammonia and perchlorate. Composite soil samples were analyzed for polychlorinated biphenyls (PCBs) (Table I-1). The distribution of detected constituents in the site media are illustrated on Figures I-2 and I-3.

Based on the human health risk assessment, unacceptable risks were estimated for hypothetical future residents for metals (aluminum, arsenic, cobalt, and manganese) in groundwater. An unacceptable risk was also estimated for Arochlor-1254 (PCB) in surface soil. An unacceptable risk to ecological receptors was also estimated for zinc in surface soil. Table I-2 summarizes the results of the risk assessment for Subarea I based on the data collected to date. Metals in groundwater are being evaluated separately as part of a desktop study for the RFI to determine if concentrations represent background conditions (either naturally occurring or area-wide anthropogenic conditions).

To characterize the nature and extent of contamination in soil at Subarea I, additional activities are proposed.

Purpose of FTMR. The purpose of this FTMR form is to present the supplemental sampling to: 1) further characterize the extent of PCB contamination in soil around 18ICP003, and 2) collect surface soil samples to define the extent of zinc contamination in the area of 18ISS005. Supplemental sampling will also be conducted at Subarea I to confirm the presence of chromium in site media at SWMU 18 as the trivalent species.

Proposed Supplemental Activities. The supplemental sampling will be performed as described in this FTMR form and the approved September 2011 SAP. This FTMR form includes figures and tables needed to perform the additional activities.

The approximate locations of the supplemental samples are shown on Figure I-5; the supplemental sampling and analysis is presented on attached Table I-4 and described as follows:

- **Soil:** Four surface soil samples will be collected in the area of 18ICP003 to characterize the extent of PCB contamination in that area. The proposed sample locations are shown on Figure I-4. Surface soil samples will be discrete samples collected from 0 to 2 foot using a hand auger. The samples will be collected and according to SOP-10 of the approved September 2011 SAP.

Two surface soil samples (18ISS006 and 18ISS007) will be collected in the area of 18ISS005 to define the extent of zinc contamination in that area. The proposed sample locations are shown on Figure I-5. Surface soil samples will be discrete samples collected from 0 to 2 foot using a hand auger. The samples will be collected and according to SOP-10 of the approved September 2011 SAP. In addition, the soil sample from the location of 18ISS006 will also be analyzed for chromium speciation. The analysis method for the chromium speciation will be SW-846 Method 7199.

- **Groundwater:** A groundwater sample will be collected from monitoring well 18IMWT001 and analyzed for chromium speciation. Monitoring well 18IMWT001 will be purged and sampled in accordance with SOP-16 and SOP-17 of the September 2011 SAP. The analysis method for the chromium speciation will be SW-846 Method 7199.

Attachments to this FTMR include:

Figures

- Figure I-1 Sample Locations (2011/2012)
- Figure I-2 Exceedances of Analytes in Soil
- Figure I-3 Exceedances of Analytes in Groundwater
- Figure I-4 Groundwater Potentiometric Surface Map
- Figure I-5 Proposed Sample Locations

Table

- Table I-1 Summary of Environmental Samples and Laboratory Analyses
- Table I-2 Summary of Receptor-Specific Human Risks and Hazards, Ecological Risks, and Recommendations
- Table I-3 Groundwater Quality Data
- Table I-4 Proposed Supplemental Sampling and Analysis

Reason for Change/Modification: Supplemental activities for characterization of nature and extent of constituents of concern, based on potential unacceptable human health and ecological risks

Person Requesting Change/Modification:

 2/15/13
Tim Evans, Project Manager / Date

Approvals:

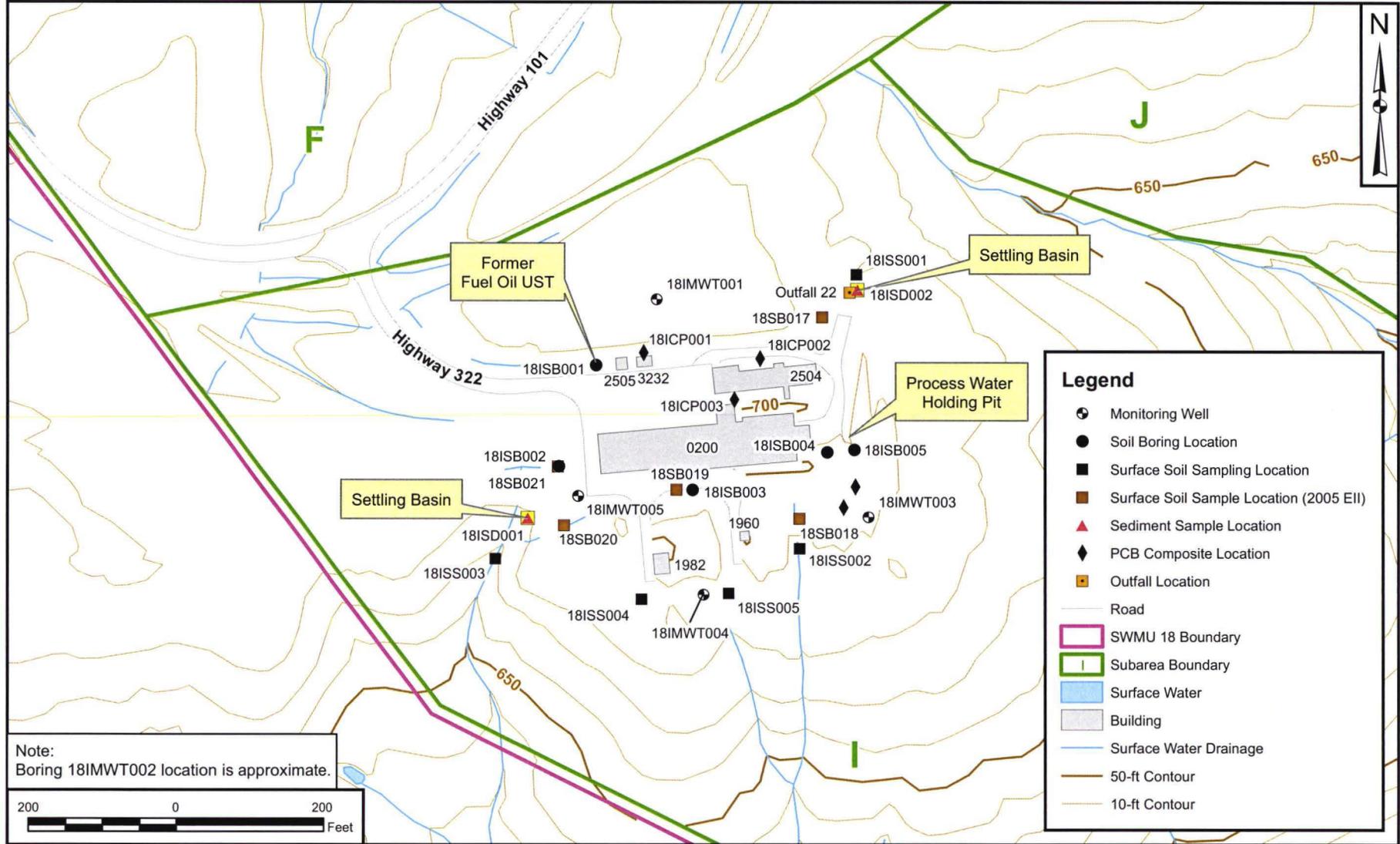
 02/15/13
Ralph Basinski, Tetra Tech Activity Coordinator / Date

Modifications to the HASP required based on this change? Yes No NA

N/A
Health Safety Manager (Signature)

N/A
Date

FIGURES



Note:
Boring 18IMWT002 location is approximate.

200 0 200
Feet

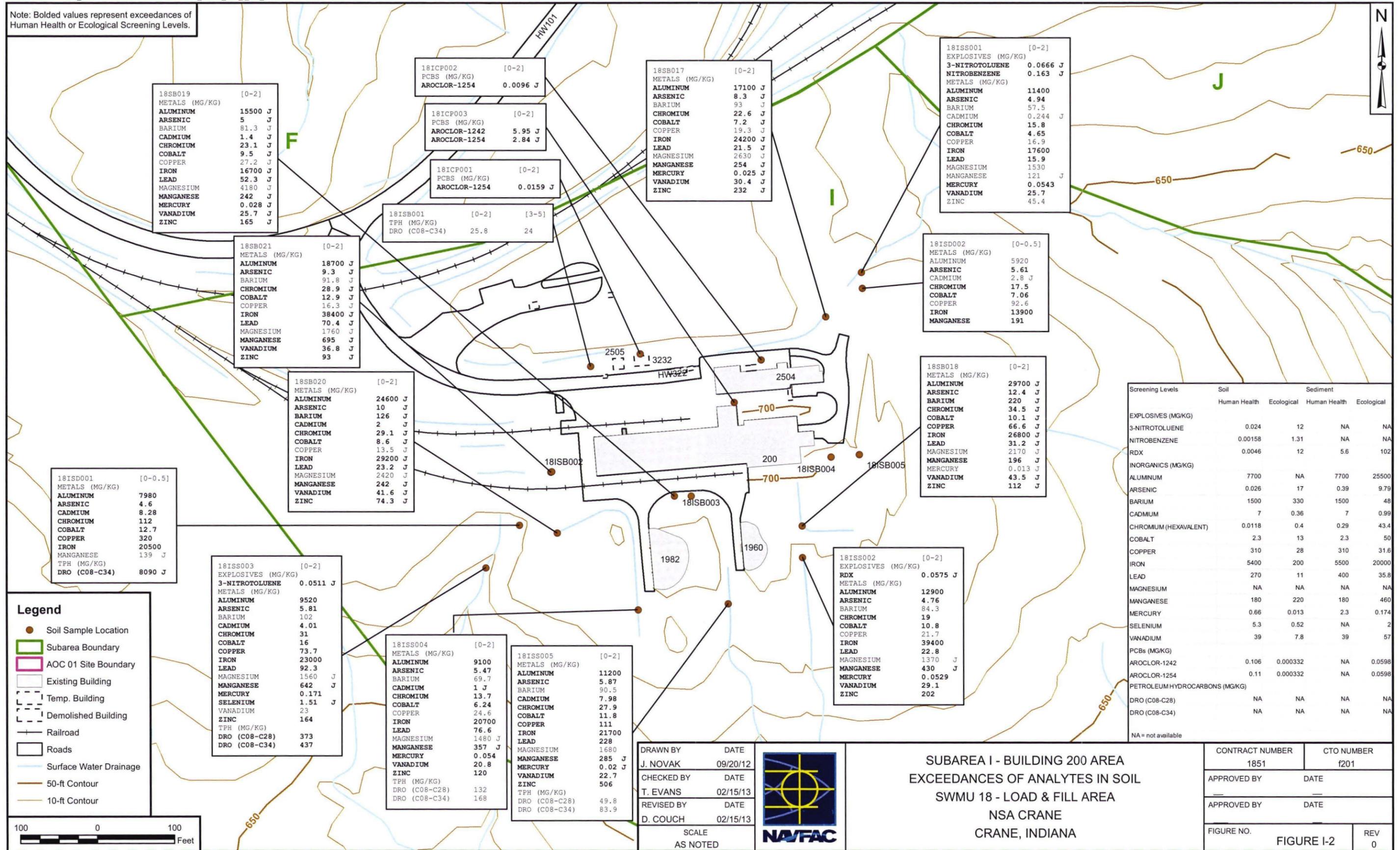
DRAWN BY	DATE
J. ENGLISH	02/16/12
CHECKED BY	DATE
T. EVANS	02/15/13
REVISED BY	DATE
D. COUCH	02/15/13
SCALE AS NOTED	



SUBAREA I - BUILDING 200 AREA
SAMPLE LOCATIONS (2011/2012)
SWMU 18 - LOAD & FILL AREA
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER 1851	CTO NUMBER F201
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. FIGURE I-1	REV 0

Note: Bolded values represent exceedances of Human Health or Ecological Screening Levels.



18SB019 [0-2]
METALS (MG/KG)

ALUMINUM	15500 J
ARSENIC	5 J
BARIIUM	81.3 J
CADMIUM	1.4 J
CHROMIUM	23.1 J
COBALT	9.5 J
COPPER	27.2 J
IRON	16700 J
LEAD	52.3 J
MAGNESIUM	4180 J
MANGANESE	242 J
MERCURY	0.028 J
VANADIUM	25.7 J
ZINC	165 J

18ICP002 [0-2]
PCBS (MG/KG)

AROCLOR-1254	0.0096 J
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18SB017 [0-2]
METALS (MG/KG)

ALUMINUM	17100 J
ARSENIC	8.3 J
BARIIUM	93 J
CHROMIUM	22.6 J
COBALT	7.2 J
COPPER	19.3 J
IRON	24200 J
LEAD	21.5 J
MAGNESIUM	2630 J
MANGANESE	254 J
MERCURY	0.025 J
VANADIUM	30.4 J
ZINC	232 J

18ISS001 [0-2]
EXPLOSIVES (MG/KG)

3-NITROTOLUENE	0.0666 J
NITROBENZENE	0.163 J
METALS (MG/KG)	
ALUMINUM	11400
ARSENIC	4.94
BARIIUM	57.5
CADMIUM	0.244 J
CHROMIUM	15.8
COBALT	4.65
COPPER	16.9
IRON	17600
LEAD	15.9
MAGNESIUM	1530
MANGANESE	121 J
MERCURY	0.0543
VANADIUM	25.7
ZINC	45.4

18SB021 [0-2]
METALS (MG/KG)

ALUMINUM	18700 J
ARSENIC	9.3 J
BARIIUM	91.8 J
CHROMIUM	28.9 J
COBALT	12.9 J
COPPER	16.3 J
IRON	38400 J
LEAD	70.4 J
MAGNESIUM	1760 J
MANGANESE	695 J
VANADIUM	36.8 J
ZINC	93 J

18ICP001 [0-2]
PCBS (MG/KG)

AROCLOR-1254	0.0159 J
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18ISB001 [0-2] [3-5]
TPH (MG/KG)

DRO (C08-C34)	25.8	24
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18ISD002 [0-0.5]
METALS (MG/KG)

ALUMINUM	5920
ARSENIC	5.61
CADMIUM	2.8 J
CHROMIUM	17.5
COBALT	7.06
COPPER	92.6
IRON	13900
MANGANESE	191

18SB020 [0-2]
METALS (MG/KG)

ALUMINUM	24600 J
ARSENIC	10 J
BARIIUM	126 J
CADMIUM	2 J
CHROMIUM	29.1 J
COBALT	8.6 J
COPPER	13.5 J
IRON	29200 J
LEAD	23.2 J
MAGNESIUM	2420 J
MANGANESE	242 J
VANADIUM	41.6 J
ZINC	74.3 J

18SB018 [0-2]
METALS (MG/KG)

ALUMINUM	29700 J
ARSENIC	12.4 J
BARIIUM	220 J
CHROMIUM	34.5 J
COBALT	10.1 J
COPPER	66.6 J
IRON	26800 J
LEAD	31.2 J
MAGNESIUM	2170 J
MANGANESE	196 J
MERCURY	0.013 J
VANADIUM	43.5 J
ZINC	112 J

18ISD001 [0-0.5]
METALS (MG/KG)

ALUMINUM	7980
ARSENIC	4.6
CADMIUM	8.28
CHROMIUM	112
COBALT	12.7
COPPER	320
IRON	20500
MANGANESE	139 J
TPH (MG/KG)	
DRO (C08-C34)	8090 J

18ISS003 [0-2]
EXPLOSIVES (MG/KG)

3-NITROTOLUENE	0.0511 J
METALS (MG/KG)	
ALUMINUM	9520
ARSENIC	5.81
BARIIUM	102
CADMIUM	4.01
CHROMIUM	31
COBALT	16
COPPER	73.7
IRON	23000
LEAD	92.3
MAGNESIUM	1560 J
MANGANESE	642 J
MERCURY	0.171
SELENIUM	1.51 J
VANADIUM	23
ZINC	164
TPH (MG/KG)	
DRO (C08-C28)	373
DRO (C08-C34)	437

18ISS004 [0-2]
METALS (MG/KG)

ALUMINUM	9100
ARSENIC	5.47
BARIIUM	69.7
CADMIUM	1 J
CHROMIUM	13.7
COBALT	6.24
COPPER	24.6
IRON	20700
LEAD	76.6
MAGNESIUM	1480 J
MANGANESE	357 J
MERCURY	0.054
VANADIUM	20.8
ZINC	120
TPH (MG/KG)	
DRO (C08-C28)	132
DRO (C08-C34)	168

18ISS005 [0-2]
METALS (MG/KG)

ALUMINUM	11200
ARSENIC	5.87
BARIIUM	90.5
CADMIUM	7.98
CHROMIUM	27.9
COBALT	11.8
COPPER	111
IRON	21700
LEAD	228
MAGNESIUM	1680
MANGANESE	285 J
MERCURY	0.02 J
VANADIUM	22.7
ZINC	506
TPH (MG/KG)	
DRO (C08-C28)	49.8
DRO (C08-C34)	83.9

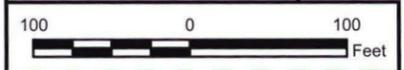
18ISS002 [0-2]
EXPLOSIVES (MG/KG)

RDX	0.0575 J
METALS (MG/KG)	
ALUMINUM	12900
ARSENIC	4.76
BARIIUM	84.3
CHROMIUM	19
COBALT	10.8
COPPER	21.7
IRON	39400
LEAD	22.8
MAGNESIUM	1370 J
MANGANESE	430 J
MERCURY	0.0529
VANADIUM	29.1
ZINC	202

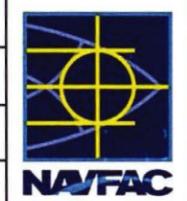
Screening Levels	Soil		Sediment	
	Human Health	Ecological	Human Health	Ecological
EXPLOSIVES (MG/KG)				
3-NITROTOLUENE	0.024	12	NA	NA
NITROBENZENE	0.00158	1.31	NA	NA
RDX	0.0046	12	5.6	102
INORGANICS (MG/KG)				
ALUMINUM	7700	NA	7700	25500
ARSENIC	0.026	17	0.39	9.79
BARIIUM	1500	330	1500	48
CADMIUM	7	0.36	7	0.99
CHROMIUM (HEXAVALENT)	0.0118	0.4	0.29	43.4
COBALT	2.3	13	2.3	50
COPPER	310	28	310	31.6
IRON	5400	200	5500	20000
LEAD	270	11	400	35.8
MAGNESIUM	NA	NA	NA	NA
MANGANESE	180	220	180	460
MERCURY	0.66	0.013	2.3	0.174
SELENIUM	5.3	0.52	NA	2
VANADIUM	39	7.8	39	57
PCBS (MG/KG)				
AROCLOR-1242	0.106	0.000332	NA	0.0598
AROCLOR-1254	0.11	0.000332	NA	0.0598
PETROLEUM HYDROCARBONS (MG/KG)				
DRO (C08-C28)	NA	NA	NA	NA
DRO (C08-C34)	NA	NA	NA	NA

NA = not available

- Legend**
- Soil Sample Location
 - ▭ Subarea Boundary
 - ▭ AOC 01 Site Boundary
 - ▭ Existing Building
 - ▭ Temp. Building
 - ▭ Demolished Building
 - Railroad
 - ▭ Roads
 - Surface Water Drainage
 - 50-ft Contour
 - 10-ft Contour



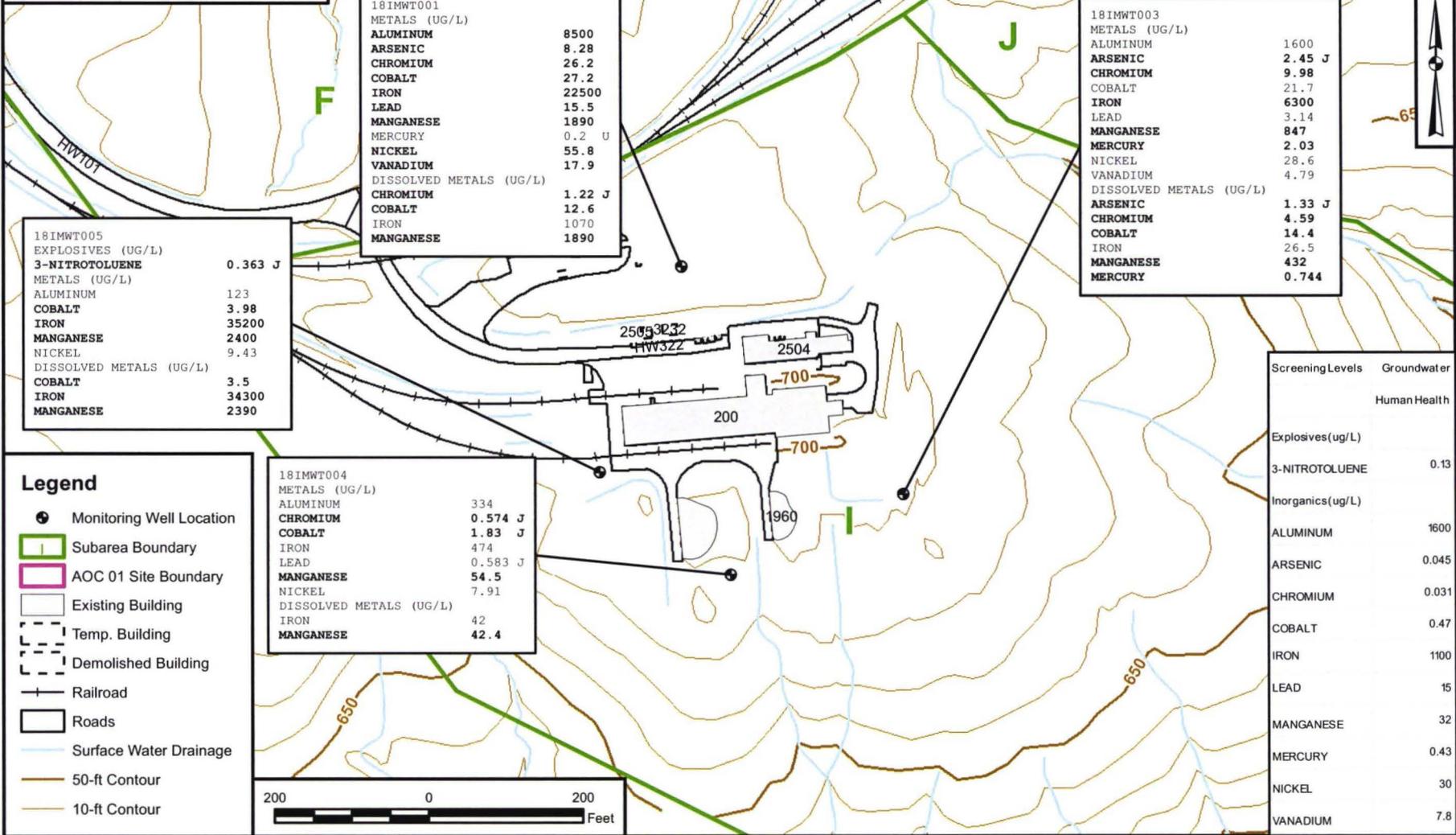
DRAWN BY: J. NOVAK
DATE: 09/20/12
CHECKED BY: T. EVANS
DATE: 02/15/13
REVISED BY: D. COUCH
DATE: 02/15/13
SCALE: AS NOTED



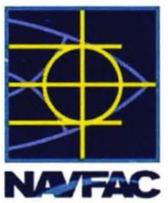
SUBAREA I - BUILDING 200 AREA
EXCEEDANCES OF ANALYTES IN SOIL
SWMU 18 - LOAD & FILL AREA
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER	1851	CTO NUMBER	f201
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FIGURE NO.	FIGURE I-2	REV	0

Note: Bolded values represent exceedances of Human Health or Ecological Screening Levels.

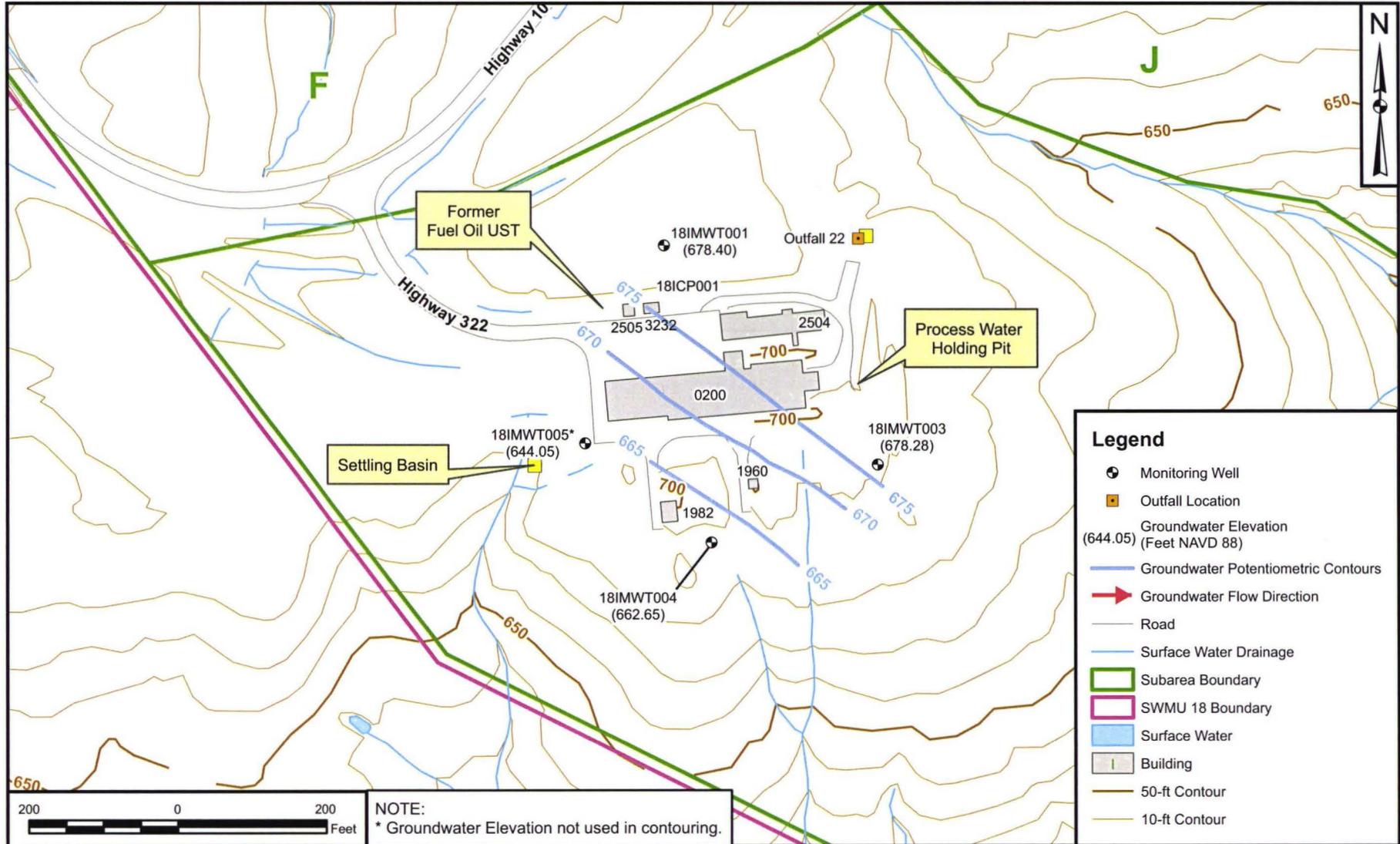


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J. ENGLISH	02/16/12
CHECKED BY	DATE
T. EVANS	11/02/12
REVISED BY	DATE
J. NOVAK	11/02/12
SCALE AS NOTED	



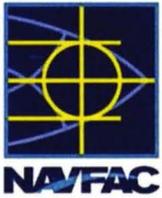
SUBAREA I - BUILDING 200 AREA
EXCEEDANCES OF ANALYTES IN GROUNDWATER
SWMU 18 - LOAD & FILL AREA
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER	CTO NUMBER
1851	F201
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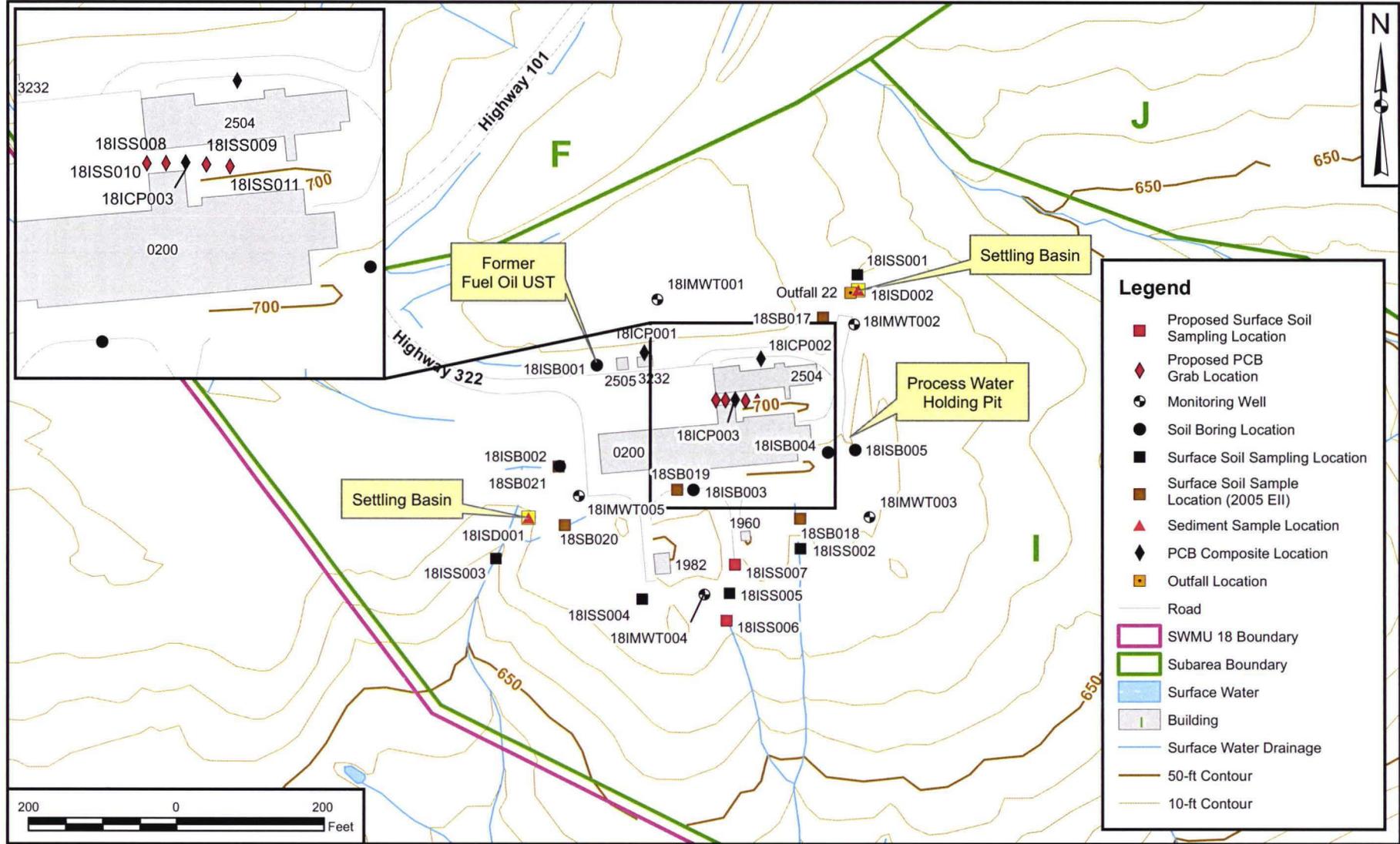
NOTE:
* Groundwater Elevation not used in contouring.

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C. TULLEY	03/06/12
CHECKED BY	DATE
M. MENGEL	10/03/12
REVISED BY	DATE
J. ENGLISH	10/03/12
SCALE AS NOTED	

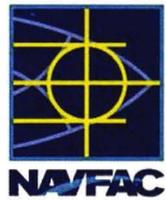


SUBAREA I - BUILDING 200 AREA
GROUNDWATER POTENTIOMETRIC MAP
SWMU 18 - LOAD & FILL AREA
NSA CRANE
CRANE, INDIANA

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J. ENGLISH	10/03/12
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C. RUMER	02/13/13
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D. COUCH	02/13/13
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SUBAREA I - BUILDING 200 AREA
PROPOSED SAMPLE LOCATIONS
SWMU 18 - LOAD & FILL AREA
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER 1851	CTO NUMBER F201
APPROVED BY —	DATE —
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FIGURE NO. FIGURE I-5	REV 0

TABLES

TABLE I-2

SUMMARY OF RECEPTOR-SPECIFIC HUMAN RISKS AND HAZARDS AND ECOLOGICAL RISKS
 SUBAREA I - BUILDING 200 AREA
 SWMU 18 - LOAD AND FILL AREA
 NSA CRANE
 CRANE, INDIANA

PAGE 1 OF 2

Receptor Population	Environmental Media	Overall Carcinogenic Risk (Human)	Overall Hazard Index (Human)	Overall Risk (Ecological)	Critical Pathways & Chemicals of Concern
Current/Future Trespassers (Adolescent)	Surface Soil	2E-06	0.06	NA	NA
Future Construction Worker (Adult)	Surface Soil	5E-06	0.5	NA	NA
	Groundwater	2E-07	0.5	NA	NA
Future Industrial Worker (Adult)	Surface Soil	2E-05	0.3	NA	NA
Future Recreational User (Adult)	Surface Soil	3E-06	0.05	NA	NA
Future Recreational User (Child)	Surface Soil	9E-06	0.3	NA	NA
Future Recreational User (Lifelong)	Surface Soil	1E-05	NA	NA	NA
Future Resident (Adult)	Surface Soil	3E-05	0.4	NA	NA
	Groundwater	4E-04 (1E-04) ⁽²⁾	9 (8) ⁽²⁾	NA	Ingestion of groundwater (aluminum, arsenic, chromium, cobalt, and manganese)
Future Resident (Child)	Surface Soil	1E-04	4 (3) ⁽²⁾	NA	Aroclor-1254
	Groundwater	7E-04 (7E-05) ⁽²⁾	21 (20) ⁽²⁾	NA	Ingestion of groundwater (aluminum, arsenic, chromium, cobalt, iron, and manganese)

TABLE I-2

SUMMARY OF RECEPTOR-SPECIFIC HUMAN RISKS AND HAZARDS AND ECOLOGICAL RISKS
 SUBAREA I - BUILDING 200 AREA
 SWMU 18 - LOAD AND FILL AREA
 NSA CRANE
 CRANE, INDIANA

PAGE 2 OF 2

Receptor Population	Environmental Media	Overall Carcinogenic Risk (Human)	Overall Hazard Index (Human)	Overall Risk (Ecological)	Critical Pathways & Chemicals of Concern
Future Resident (Lifelong)	Surface Soil	1E-04	NA	NA	NA
	Groundwater	1E-03 (2E-04) ⁽²⁾	NA	NA	Ingestion of groundwater (arsenic and chromium)
Terrestrial Plants and Invertebrates	Surface Soil	NA	NA	Unacceptable	Terrestrial plants and invertebrates contacting soils (zinc)
Mammals and Birds	Surface Soil	NA	NA	Acceptable	NA

Notes

NA = Not Applicable

Shaded cells have unacceptable risk or hazard.

Bolded parameters represent significant contributor to overall risk or hazard.

⁽¹⁾ Target organs hazard index is less than 1.

⁽²⁾ Chromium was evaluated in the human health risk assessment as hexavalent chromium. Value in parenthesis is cancer risk or hazard index if chromium is evaluated as trivalent chromium.

TABLE I-3

**GROUNDWATER QUALITY DATA
SUBAREA I - BUILDING 200 AREA
SWMU 18 - LOAD AND FILL AREA
NSA CRANE, IN**

Well Number	Sample ID	Sample Date	pH	Spec Cond (mS/cm)	Temp (dC)	Turb (NTU)	Diss Oxygen (mg/L)	ORP (mV)
18IMWT001	18IGWT001	1/23/2012	6.09	0.724	10.61	91.6	0.169	161
18IMWT003	18IGWT003	1/23/2012	5.97	1.51	11.58	330	0.88	159
18IMWT004	18IGWT004	1/23/2012	5.95	0.834	10.40	130	1.26	222
18IMWT005	18IGWT005	1/23/2012	6.05	1.16	12.35	26.1	0.52	5

TABLE I-4

PROPOSED SUPPLEMENTAL SAMPLING AND ANALYSIS
 SWMU 18 - LOAD AND FILL AREA
 SUBAREA I - BUILDING 200 AREA
 NAVAL SUPPORT ACTIVITY, CRANE, INDIANA
 PAGE 1 OF 1

Sampling Location	ID Number	Matrix	Depth (feet bgs)	Analysis	Number of Samples	Sampling SOP Reference ⁽¹⁾
18ISS006	18ISS0060002	Soil	0 - 2'	TAL Metals Chromium (III +VI)	1 + 1 FD	SOP-08, SOP-09, SOP-10
18ISS007	18ISS0070002	Soil	0 - 2'	TAL Metals	1	SOP-08, SOP-09, SOP-10
18ISS008	18ISS0080002	Soil	0 - 2'	PCBs	1 + 1 FD	SOP-08, SOP-09, SOP-10
18ISS009	18ISS0090002	Soil	0 - 2'	PCBs	1	SOP-08, SOP-09, SOP-10
18ISS010	18ISS0100002	Soil	0 - 2'	PCBs	1	SOP-08, SOP-09, SOP-10
18ISS011	18ISS0110002	Soil	0 - 2'	PCBs	1	SOP-08, SOP-09, SOP-10
18IMWT001	18IGWT001	Groundwater	NA	Chromium (III +VI)	1 + 1 FD	SOP-16, SOP-17

Note:

⁽¹⁾ Sampling SOP reference from SWMU 18 RFI UFP-SAP (Tetra Tech, September 2011)

FD = Field Duplicate